DOCUMENT RESUME

ED 228 610 CS 007 059

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TITLE The Right Brain: An Active Partner in Written Literacy.
PUB DATE Dec 82
NOTE 17p.; Paper presented at the Annual Meeting of the Eastern Regional Conference of the International Reading Association (4th, Boston, MA, December 2-5, 1982).
PUB TYPE Viewpoints (120) -- Guides - Classroom Use - Guides (For Teachers) (052) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Advance Organizers; *Cerebral Dominance; Cognitive Style; *Diagrams; Educational Practices; Elementary Secondary Education; Higher Education; *Instructional Improvement; Instructional Materials; Reading Difficulties; *Reading Instruction; *Reading Processes; *Teaching Methods
IDENTIFIERS Brain Hemispheres; *Semantic Webbing

ABSTRACT

The human brain is composed of two interdependent systems, the left hemisphere and the right hemisphere. While the left brain analyzes sequentially the phonemes of our language and names or reads words, the right brain produces the images, feelings, and associations connected with the words. Current educational systems, however, are doing little to use and nurture the potential strengths of right hemisphere involvement in learning. Curricula that stress the "3 R's" educate only one half of the brain, but children whose predominate cognitive style is right hemispheric need nonverbal visual-spatial strategies as part of their reading and writing training. A graphic configuration called a "web," a visual-spatial network with nodes and emanating lines representing the connections among ideas in our mind, has been developed to provide reading and writing activities that integrate the processing power of both hemispheres. Webs have been used to help students visualize how new information fits into their existing cognitive framework, to promote prediction of story events, to serve as advanced organizers for disabled readers, and to provide a means to build vocabulary. (JL)

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Paper presented at the 4th Eastern Regional Conference of the IRA, December 3, 198 , Boston, Massachusetts

CS007059

Within the last twenty years, research has emerged concerning brain functioning and the development of learning. Since the findings of Paul Broca in the 1860's, language and cognition were primarily associated with the left hemisphere while the right hemisphere was thought to be an inactive mirror of its dominant partner. However, the revolutionary work of Drs. Joseph Bogen and Roger Sperry has demonstrated that the human brain is composed of two interdependent systems, the left hemisphere and the right hemisphere, connected by a neural bridge called the corpus callosum, and that each hemisphere has a unique information processing style and mode of memory. It is known now that right hemisphere involvement is an integral part of language learning and concept development and that hemispheric specialization falls along a continuum with each hemisphere capable of processing various kinds of information but differing from each other in approach and efficiency.

What processing skills and abilities have been attributed to each hemisphere? Current research findings uphold the traditional beliefs that the left hemisphere is the dominant language center for the majority of the population. Our left brain names things, places, letters, numbers and words (Sperry, 1968). It can deduce logical, functional relations among objects, and through its temporal and serial processing, decode phonemic speech sounds and analyze the semantic content of words (Levy and Trevarthen, 1976; Levy, 1974).

Conversely the right hemisphere is superior in managing

visual-spatial tasks such as arranging blocks to match a design or drawing cubes (Gazzaniga, 1977). It has the ability to match people, places and things on the basis of their appearance (Levy, Trevarthen & Sperry, 1972), helps us to recognize and find our place in familiar surroundings (Nebes, 1977), processes emotional information (Sackheim, 1978), and holds our secret hopes and desires (Le Doux, Wilson & Gazzaniga, 1977). It is our right brain that maintains our sense of identity and body image.

Thus, the left hemisphere and right hemisphere work in harmony through complimentary information processing. While the left brain analyzes sequentially the phonemes of our language and names or reads words, the right brain produces the images, feelings and associations connected with the words. When the left brain responds to the literal meaning, the right brain creates a metaphor and evolves the clever insights that are part of creativity. Working together, each contributes its dominant talent to build our conceptual store.

Within the context of present day educational systems, little is being done to utilize and nurture the potential strengths of right hemisphere involvement in learning. Because of society's focus on the "3 Rs" elementary school programs are primarily left-hemisphere bound. In other words, curricula that foster the mastery of reading, writing and arithmetic, in effect, educate one hemisphere of the brain while leaving half of an individual's intellectual capabilities unschooled. This phenomenon may, in part, be due to the educational establishment's intense and unbalanced

preoccupation with verbal knowledge because it is less difficult to quantify and assess than creativity, synthesis, and intuition. Traditionally, declining reading and writing achievement as evidenced by unsatisfactory scores on standardized instruments has inflamed public concern and fostered a back-to-basics movement which demands teacher and administrator accountability. As a result of these pressures, many atomistic reading and writing programs that emphasize decoding and word attack skills have been installed in classrooms and remedial reading labs. The acts of reading and writing have been defined as and broken down into a hierarchy of discrete subskills. After a student has worked through a series of exercises purporting to teach and reinforce a specific skill, a paper and pencil test is taken to demonstrate mastery. It is assumed that after the completion of many such exercises reading and writing are learned as outcomes of the cumulative experience. Thus, the qualities of the right hemisphere which are essential for creative insight and affective response to reading and writing tend to be inadequately developed and trained. Complimentary hemispheric processing is not supported in these analytically based, verbally focused reading systems. In fact, for some children, most notably those who may be classified as gifted, talented or disabled in reading and writing skills, right hemisphere processing may be their predominate cognitive style. Thus, nonverbal visual-spatial strategies should be part of their reading and writing training if they are going to succeed. The education of these students who need holistic and experientially based approaches

to literacy is sorely neglected.

The objective of this paper is to present some activities for reading and writing which integrate the processing power of both hemispheres of the brain. To accomplish this, a graphic configuration called a web will be developed. This visual-spatial network with its nodes and emanating lines represents the connections among ideas in our mind. It is a "picture" of our schemata; an "x-ray" of our system of concepts and associations.

Within the past few years, webs have been used in many different ways. Henry (1974) and Gerhard (1975) used them to develop instructional models. Pearson and Johnson (1978) proposed that webs be used to help students expand their vocabulary and their knowledge about concepts. Because the linking network of nodes and lines depicts relationships among old and new pieces of information, they believed this device helped students to visualize how new information fits into their existing cognitive framework. Thus, new learning is meaningfully integrated with previous experiences.

Freedman and Reynolds (1980) presented a technique to use semantic webs to enhance the comprehension of basal reader stories. They advised using the visual display of the web to promote prediction of story events. Cleland (1981) generated three types of semantic webs -- the episodic web; the inductive web and the emotions web -- in order to help remedial readers organize relationships among story characters and events. He felt the webs represented

an effective technique for enabling students to identify and discuss issues in stories they were reading.

A study conducted by Sinatra, Gemake and Berg (1983) investigated semantic webbing as a means of improving reading comprehension with a reading disabled population. Twenty-seven youngsters, enrolled in the St. John's Reading Clinic, ranging in grade level from second to eighth grade, were presented with two approaches to reading - a traditional basal reading approach and the use of webs as advanced organizers to enhance understanding. When results of comprehension measures from the two approaches were compared, the mean difference in favor of the webbing approach was significant (.05 level). The web facilitated the storage and recall of information.

Wittrock (1978) reported that the right brain uses global holistic strategies to process information such as one might use when looking at a painting. The details in the piece are immediately recognized, and gain their definition from their relationship to the whole. Because semantic webs picture graphically how words and ideas are related to each other, the right brain is drawn into the learning task. The visual spatial design of the web appeals to the right hemisphere as the verbal information recorded within each node is processed by the left brain. Sinatra and Stahl-Gemake (1983) have devised three distinct web configurations so that students can recognize immediately the organization of the selection and the manner in which main ideas and details are related to each other. As an example, here is the configuration

for the episodic web. The arrows connecting the nodes help students to follow sequentially the story line and order the events.

Insert Figure One Here

The web, because of its configuration is easily understood by the students who have an intuitive schema for stories which unfold in chronological , logical sequences (Stein & Glenn, 1977).

The following episodic web, constructed for the selection, "A Gift for Miss Gomez" from a second grade level Reader's Digest Skill Builder, Silver Edition (1977), provides an example of this effective method for organizing and aiding reading comprehension (Sinatra, Gemake and Berg, 1983).

Insert Figure Two Here

The main ideas and details, arranged sequentially, are easy to follow in this visual-spatial configuration.

Webs present a powerful means to build vocabulary too. Students are involved in language building throughout the process of developing the diagram, and imagery is used to conjure up the associations to be recorded in the nodes of the web.

In working with primary grade students, words of high imagery were placed in the central node. The students' ideas, related to the high imagery stimulus word, were recorded in categories

around the central node. Here is a descriptive web created for cat.

Insert Figure Three Here

We found that primary and disabled students could read words placed in the nodes. This holistic exposure enabled students to build a sight vocabulary. After completing the diagram from the students' associations, the words were printed on index cards for review. We discovered that students, unable to recall words, would frequently remember the word when permitted to replace the word in the web. Thus, the web became a tool for introducing as well as reinforcing sight vocabulary (Sinatra & Stahl-Gemake, 1983). Paivio, Yuille & Madigan (1968) have listed words with high imagery associations that can be used in descriptive webs to build related vocabulary.

A semantic web, then, can be a powerful way to build vocabulary and enhance reading comprehension. Verbal information is captured in a nonverbal, configurational format. Complimentary functioning is promoted in an approach with left brain as well as right brain appeal. Thus, all students are encouraged to use their powers of integrated cognitive processing to achieve success in reading.

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Figure One

Example of Episodic Web

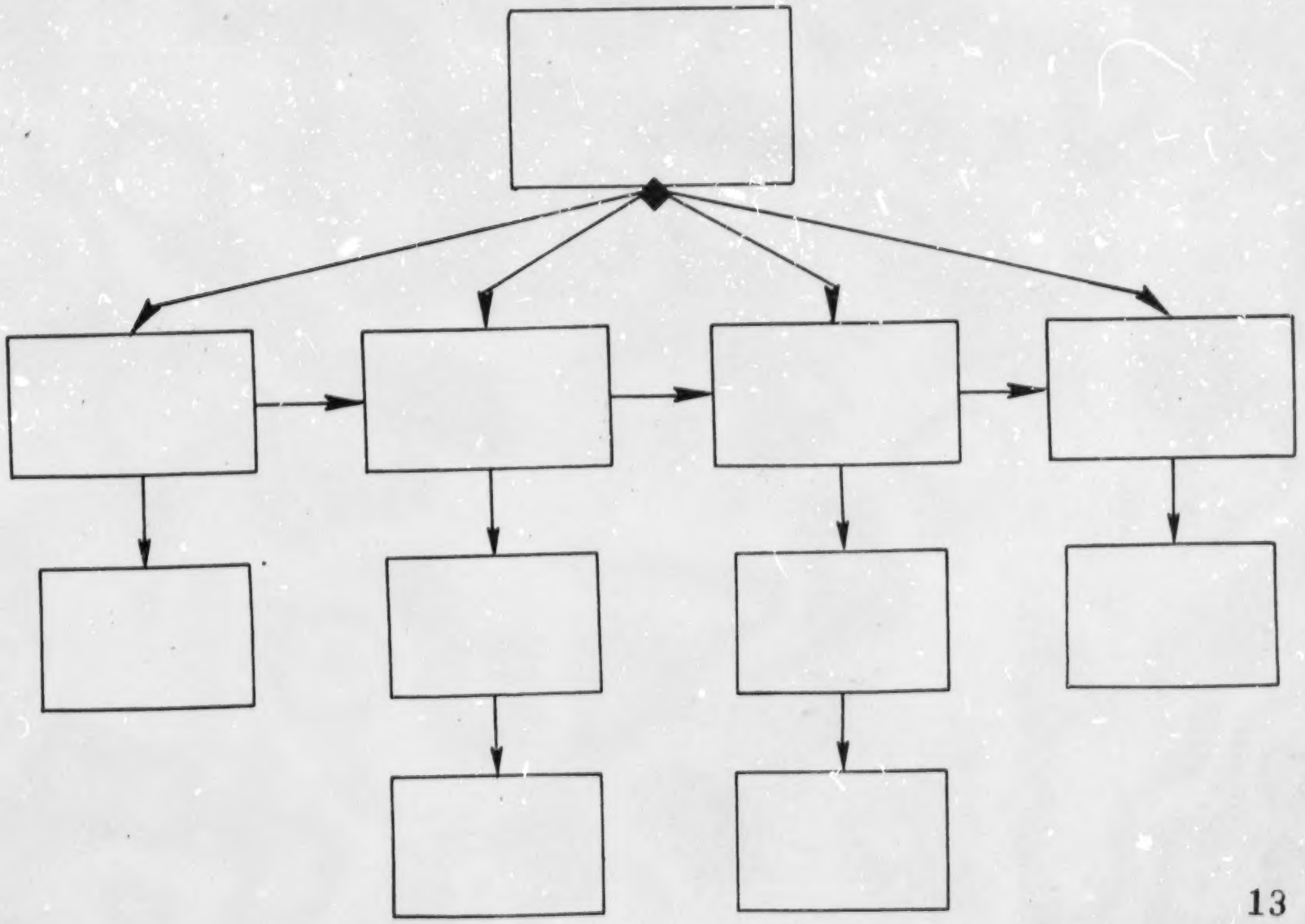

Figure Two

Episodic Map for "A Gift for Miss Gomez",
Readability 2

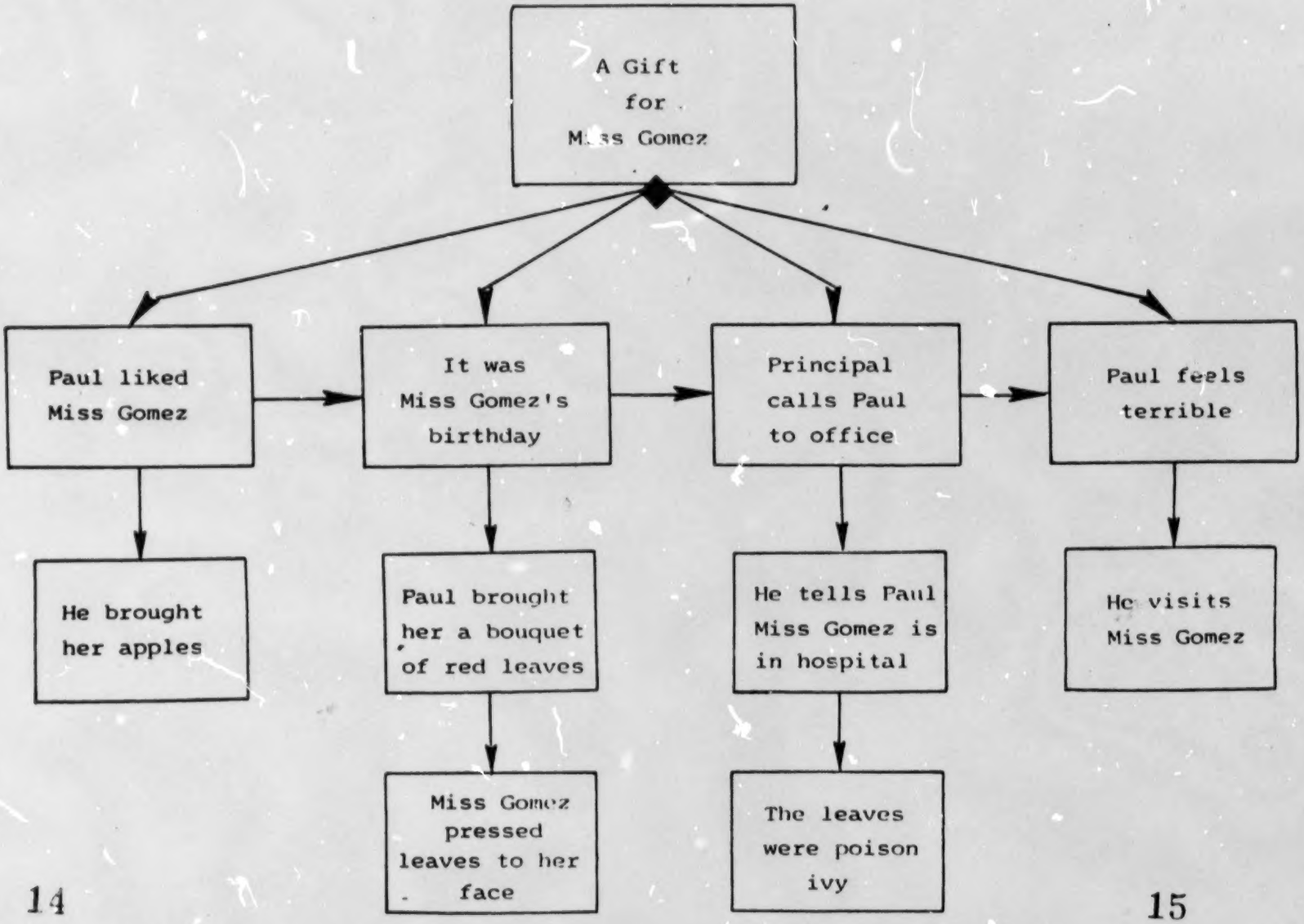
A Gift for Miss Gomez
Paul liked Miss Gomez
It was Miss Gomez's birthday
Principal calls Paul to office
Paul feels terrible
He brought her apples
Paul brought her a bouquet of red leaves
He tells Paul Miss Gomez is in hospital
He visits Miss Gomez
Miss Gomez pressed leaves to her face
The leaves were poison ivy

Figure Three

High Imagery Vocabulary Web for Cat